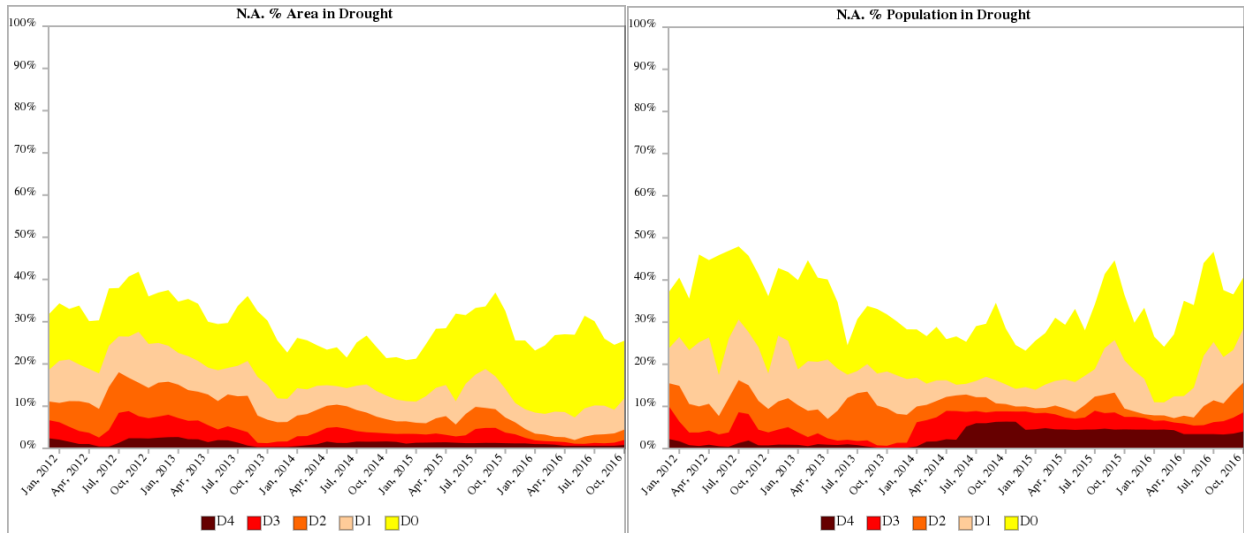


North American Drought Monitor—October 2016

At the end of October 2016, moderate to exceptional drought (D1-D4) affected approximately 11.7% of the area and 28.3% of the population of North America. The percent area value is 2.7% more than the value for the end of September 2016, and the percent population value is 5.0% more than the value for the end of September.



CANADA: Drought conditions across Canada improved in the month of October. Much of the country experienced above-average precipitation over the past 31 days; some regions across the Prairies received too much, resulting in excessive moisture and negative impacts on harvest operations. Soil moisture improved significantly across the Atlantic region with large swaths of precipitation throughout the month; however, long-term drought impacts on ground water and streamflow remained. Dry conditions persisted in northern British Columbia and portions of southeastern Ontario, where long-term drought remained more of a concern.

Western: The Pacific region saw a variable amount of precipitation in October, with high precipitation in the south and a deficit in the northern half of the province. All drought concerns in southern British Columbia (B.C.) were eliminated as a result of normal to above-normal precipitation levels and improved streamflow. The Abnormally Dry (D0) pocket in Northern B.C. was reduced away from Fort Nelson, as precipitation analysis indicated this area was no longer a concern. A large D0 pocket throughout much of northwestern B.C. persisted, including all of Haida Gwaii and Prince Rupert, up to the border with Yukon Territory. Precipitation indices indicated that northern Haida Gwaii and parts of northwestern B.C. continued to be in Moderate Drought (D1). Precipitation analysis and poor streamflow led to a downgrading of small pockets surrounding Prince Rupert and Meziadin Junction to Severe Drought (D2).

Drought was not a concern across the prairies this month. On the contrary, frost and excessive moisture negatively impacted harvest throughout much of the region. Alberta, Saskatchewan, and Manitoba had exceptional streamflow, with many areas receiving more than 150 percent above average precipitation throughout the fall period. The Abnormally Dry (D0) pockets in northern Alberta and northeast Manitoba persisted because of long-term conditions and lingering impacts.

Central: Streamflow, ground water and soil moisture continued to be a concern in southeastern Ontario, with the majority of drought conditions surrounding Lake Ontario. The north shore of Lake Ontario and the Niagara region saw very little precipitation in October, ending the growing season (April 1 to October 31) with near record low precipitation (below the 10th percentile). With little to no improvement, this region remained classified as a Severe Drought (D2). Because of poor streamflow, the Abnormally Dry (D0) pocket in southern Ontario extended east to include Petawawa and west to include Goderich. The D0 pocket surrounding North Bay was extended northeast to Matamagi, Québec, given long-term precipitation deficits and poor streamflow. A small area between North Bay and Parry Sound was also downgraded to Moderate Drought (D1) based on the Canadian Forest Service's Drought Code. Dry conditions in northern Ontario improved along the northern shore of Lake Superior and around Lake Nipigon. However, poor streamflow and precipitation deficits in this region resulted in the downgrading of a small pocket southeast of Lake Nipigon to Moderate Drought (D1) conditions.

The province of Québec experienced above-average precipitation this month; as a result, many of the dry conditions in southern Québec improved and streamflow returned to normal. The Abnormally Dry (D0) pocket in the region was pulled back due to good streamflow south of Québec City. The Moderate Drought (D1) pocket around Granby was also reduced to a small pocket around Sherbrooke. Below-average precipitation led to a small Abnormally Dry (D0) pocket being formed north of Mont-Laurier. Dry conditions in northern Québec persisted according to satellite-derived data, and therefore the D0 pocket was extended farther north to include Kangiqsujaq.

Atlantic: The Atlantic region received significant rainfall in the month of October, improving overall drought conditions throughout the region. However, despite well above normal monthly precipitation, drought remained a concern in portions of the region, especially in southern Nova Scotia, where ground water and streamflows were low. In Newfoundland, drought conditions were relieved by heavy rain; as a result, drought designations were removed or improved over most of the region including all of Cape Breton Island, Nova Scotia toward New Glasgow and Stewiacke. This also extended to an area along the shore northeast of Halifax, which no longer exhibited signs of Abnormally Dry (D0) conditions. Despite the rain elsewhere across the region, dry conditions persisted on Prince Edward Island. Moderate Drought (D1) conditions extended from O'Leary and southeast to a line stretching north of Crapaud, while the remainder of the island was blanketed by Abnormally Dry (D0) conditions. Abnormally Dry (D0) conditions also continued throughout southern New Brunswick; most areas remained the same as the previous month, with some dry conditions extending northward. Given the dry conditions indicated over the past month, some areas in southern New Brunswick were also downgraded to Moderate Drought (D1).

Northern: Across northern regions of Canada, a large area of Abnormally Dry (D0) conditions persisted into the month of October. Satellite-derived precipitation and soil moisture data indicated that large swaths of the region were Abnormally Dry (D0), stretching from southern areas of the Yukon Territory and Northwest Territories and extending as far north as Mackenzie Bay, including Great Slave Lake and Great Bear Lake.

UNITED STATES: October rains brought drought relief to the northwestern United States, eastern Oklahoma, coastal New England, and a broad area from West Virginia to western New York. Other parts of the country didn't fare as well. Warm, dry weather deteriorated conditions in the drought-stressed

Southeast and parts of the western Plains. For the contiguous United States as a whole, drought expanded and intensified during the month of October, increasing from 19.44 to 26.8 percent; severe drought increased from 8.37 to 10.95 percent; extreme drought increased from 3.14 to 4.86 percent; and exceptional drought increased from 1.17 to 1.71 percent. There was no drought in Alaska and drought increased slightly in Hawaii, from 1.06 to 1.68 percent. At the beginning of October, approximately 102.5 million people were being impacted by drought, compared to approximately 128.6 million people at the end of the month.

Temperatures: Most of the United States experienced above-normal temperatures during the month of October, with just a few patches of near-normal to below-normal temperatures in the West. Departures of more than 8 F (4 C) degrees above average were recorded across the southern plains and southern Midwest. Areas with below-average temperatures included parts of Washington, Oregon, northern California, and Montana, where departures ranged from 2 to 6 F (1 to 3 C) degrees below normal.

Precipitation: October brought a series of storms to the Pacific Northwest, resulting in monthly totals of more than 12 inches (305 mm) above normal along parts of the coast. Wetter than normal conditions were also recorded over the coastal Carolinas and Mid-Atlantic, the upper Midwest, West Virginia, and western Pennsylvania and New York. Dryness remained in the South, Southwest, and western Plains, where many areas recorded less than 25 percent of normal precipitation.

Northeast: Temperatures in the Northeast were near to above normal, with departures generally 2 to 4 degrees F (1 to 2 C) above normal. October precipitation was variable across the region. Southern Maine, southern New Hampshire, eastern Virginia, West Virginia, western Pennsylvania, and western New York saw departures of 150 to 300 percent above normal precipitation for the month. Dryness continued in the remainder of the regions with areas of Maryland and eastern New York receiving less than 25 percent of their monthly precipitation. Overall, drought expanded to now include 21.24 percent of the region, compared to 40.99 percent at the end of September. However, severe drought decreased slightly from 21.98 to 19.86 percent, with extreme drought also decreasing from 5.61 to 1.37 percent.

Southeast: Coastal areas of the region were generally wetter than normal, with monthly totals of more than 150 percent of normal from southern Virginia to Florida. Farther west in the region, drought continued and most areas received less than 25 percent of normal precipitation for the month, which equates to departures of 3 to 6 inches (76 to 152 mm) below normal. Temperatures of more than 6 degrees F (2 C) above normal in the most drought-stressed regions exacerbated conditions. Accordingly, drought expanded and intensified during the month; 38.83 percent of the region is now in drought compared to 25.45 percent one month ago. Severe drought increased from 13.15 to 27.52 percent, extreme drought increased from 4.69 to 19.68 percent, and exceptional drought increased from 0.48 to 5.06 percent of the region.

Midwest: Warmer than normal temperatures continued to dominate the Midwest in October, with departures of 2 to 4 degrees F (1 to 2 C) above normal common in the northern part of the region and departures of 6 to 10 degrees F (3 to 6 C) above normal in the southern part. Precipitation was mixed and ranged from less than 25 percent of normal in Kentucky to more than 200 percent of normal in southern Minnesota. Pockets of dryness remain in southern Iowa, eastern Missouri, and western Illinois. Moderate drought was introduced in southern Indiana and across much of Kentucky.

High Plains: Temperatures across the High Plains were generally warmer than normal, with departures ranging from 1 degree F (0.5 to 1 C) above normal in North Dakota to 6 degrees F (3 C) or more above normal in parts of South Dakota, Nebraska, Kansas, Wyoming, and Colorado. Precipitation in most of the region was normal to slightly below normal, with departures generally less than 2 inches (51 mm) below normal. Pockets of Nebraska and eastern South Dakota recorded departures of one or more inches above normal for the month, while precipitation in western Wyoming was more than 3 inches (76 mm) above normal. Drought conditions improved in northwest Wyoming and expanded in western South Dakota, eastern Colorado, central Nebraska, and western Kansas. Drought is impacting 12.91 percent of the region compared to 7.78 percent last month.

South: Dry conditions dominated most of the South, with departures 3 or more inches (76 mm) below normal common across the region. North central Oklahoma, the western border of Missouri and Arkansas, and the north central plains of Texas were wetter than normal, with departures of 1 to 3 inches (25 to 76 mm) above normal. Temperatures were above normal across the entire region, with departures ranging from 4 to 10 degrees F (2 to 6 C) above normal. The warm, dry conditions caused drought to expand; drought now covers 42.25 percent of the region compared to 10.06 percent at the end of September. Severe drought increased from 2.42 to 14.52 percent, extreme drought increased from 0.32 to 3.6 percent, and exceptional drought increased from 0.11 to 0.41 percent of the region.

West: Temperatures in the West ranged from 4 degrees F (2 C) below normal in parts of northern Montana, central Washington, central Oregon, and northern California to more than 8 degrees F (4C) above normal in eastern Colorado. Precipitation departures of 6 inches (152 mm) or more in the Northwest helped to alleviate drought and dryness in Washington, Idaho, western Montana, western Oregon, and northern California. Much of the remainder of the region remained dry. As a whole, drought in the West improved from 30.14 to 25.26 percent of the region, with severe drought decreasing from 13.10 to 11.18 percent and extreme and exceptional drought remaining unchanged at 5.73 and 2.81 percent, respectively.

MEXICO: Two frontal systems and a low pressure system brought above-normal rains to Nuevo Leon, Tamaulipas, San Luis Potosi, Veracruz, Hidalgo, and Chiapas in October. In the rest of the country, rains were near to below normal because a low number of cold fronts and tropical waves moved around the country. Another key for scarce rains was the Atlantic and Pacific High intensification, which resulted in dry, stable conditions. The main rain deficits were evident in southern Mexico, where Oaxaca, Guerrero, and Chiapas experienced their fifth, sixth, and ninth driest Octobers, respectively, according to data going back to 1941. At the national level, the country experienced its fourth driest October, with only 38.9 mm (1.53 inches) of precipitation, 51.7 percent of the October average (1941-2015); Mexico experienced the warmest October over the 1971-2016 period.

As of October 31, 2016, the portion of the country in moderate to severe drought (D1-D3) was at 8.7 percent, an increase of 2.15 percent from September 30. Regionally, these increases were observed in the Yucatan Peninsula. Dry areas (D0) also grew in Chiapas (from 18 to 31.8 percent), Guerrero (from 23.3 to 57.9 percent), Michoacan (from 48.5 to 77.5 percent) and Tabasco (from 19.5 to 37.3 percent). In northern Baja California, drought (D1-D3) persists without changes, with extreme drought (D3) covering 4.5 percent of the state.

Because of timely rains in recent months, the portion of the country without any drought or dryness stands at 73.1 percent. Most of these areas are in northern, central, and western Mexico. The central-eastern region of the country also had enough rains; abnormally dry (D0) areas in Tamaulipas and Veracruz were reduced, and severe drought (D2) and moderate drought (D1) were reduced in southern Veracruz.

Due to the absence of convective systems during the month, temperatures increased in most of the country, resulting in the warmest October on record for the 1971-2016 period, with a 23.6 degree C (75 F) national mean, 2.3 degrees C (4 F) above the October long-term average (1981-2010). Five states on the Pacific coast also reached their warmest October, in addition to Queretaro (central) and Tamaulipas (northeast). The number days with a maximum temperature above 40 degrees C (104 F) decreased; only 10 to 20 days were reported in Sonora and Sinaloa, and small areas in Nayarit, Durango, Baja California Sur, Chihuahua, and the coasts of Colima and Michoacan. On the other hand, the number days with minimum temperature rose in the high elevation of the Sierras and the Transvolcanic Belt. Up to 10 days under 0 degrees C (32 F) were observed in the Sierra Madre Occidental portion of Durango and Chihuahua, 1 to 3 days in the Sierra Madre Oriental portion of Coahuila and Nuevo Leon, and 1 to 3 days in the central portion of the Transvolcanic Belt.

National Forestry Commission (CONAFOR) data show that the area burned during the period from January 1 to November 3, 2016 was ranked as the seventh greatest amount; this is 6.7 percent less surface area than the long-term average between 1 January and 3 November (1998-2016 records). The Ministry of the Interior issued eight emergency declarations in three states that affected thirty-two municipalities during October 2016, mostly for severe rain, floods, and volcanic eruptions. At the onset of the autumn-winter season, 152,000 hectares (375,600 acres) was sown in the first month, 10.4 percent higher than the same month last year. Corn and beans were the most important crops, accounting for 65 percent of the total sown. Sinaloa, Sonora, and Veracruz were the main states with the largest area sown (62.4 percent overall). Coffee and sugar cane were reported to have been damaged by diseases. At the beginning of the fourth quarter of the year, poultry and pork production represented a growth of 3.7 percent due good epidemic control and competitive prices.